

It is understood that the above-described embodiment is merely illustrative of the application. Other embodiments may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope of the invention thereof.

1. A method for harvesting bone through a guided delivery instrumentation system which operates through a percutaneous, laparoscopic, minimally-invasive technique, comprising the steps of:

inserting an elongated guide wire with a blunt proximal end and a pointed distal end into the incision, distal end first, to a bone area to be harvested;

placing a cylindrical obturator with a generally cylindrical channel centrally formed within said obturator along its central longitudinal axis concentrically over the guide wire;

placing a first, hollow, cylindrical dilator concentrically over said obturator thereby increasing said incision to a percutaneous approach;

gently tapping said first dilator with impactor cap into said harvest site bone;

cutting a portion of said bone with said cutting tip and bringing said cut portion through the hollow cutting tip into the cutting cylinder;

closing the incision.

placing a second, hollow, cylindrical dilator concentrically over said first dilator.

placing a third, hollow, cylindrical dilator concentrically over said second dilator.

placing a hollow, cylindrical cannula having a proximal end and distal end, said distal end being longitudinally

13. A bone harvesting apparatus as recited in claim 12, wherein said coring device is comprised of:

said cutting tip has a proximal end joined to the cutter cylinder distal end and a distal end having two, protruding, generally triangular flat blades, each having two lateral sides and a distal tip, said distal tips being connected to each other, each said blade lateral side

said cutting tip has a proximal end joined to the cutter cylinder distal end and a distal end having two, protruding, generally triangular flat blades, each having two lateral sides and a distal tip, said distal tips being connected to each other, each said blade lateral side being formed into a cutting edge, said cutting tip distal end also terminating in two cutting edges positioned between said protruding blades. ¶

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[illegible]

16. A method of harvesting bone, the method comprising:  
inserting a guidance member through a percutaneous incision to a bone, at a bone harvest  
site;  
sequentially inserting a set of at least one dilation channels through the incision, a first  
dilation channel of the set having been positioned over the guidance member;  
inserting a cutter device through a member of the set of at least one dilation channels to  
engage the bone harvest site; and  
cutting the bone with the cutter device to bring a portion of the bone into the cutter device's  
interior.
17. A method according to claim 16, the method further comprising:  
making a percutaneous incision, that is at most 2 centimeters in length, above the bone  
harvest site.
18. A bone harvesting apparatus, the apparatus comprising:  
a guidance member adapted to engage a bone from which bone material is to be extracted;  
a set of at least one dilation channels, a first dilation channel of the set being adapted to be  
positioned over the guidance member; and  
a cutter device adapted to be inserted into a member of the set of at least one dilation  
channels to engage the bone, the cutter device comprising a hollow collection shaft.
19. A bone harvesting apparatus according to claim 18, wherein the cutter device is disposable.

20. A bone harvesting apparatus according to claim 18, wherein a channel of the set of at least one dilation channels is adapted to move in an arcing motion over the bone to permit the cutter device to harvest bone from more than one position.
21. A bone harvesting apparatus according to claim 18, wherein a channel of the set of at least one dilation channels comprises a pair of members protruding from its distal end to position itself against the bone.
22. A bone harvesting apparatus according to claim 21, wherein one arm of the pair of members is longer than the other arm of the pair of members.
23. A bone harvesting apparatus according to claim 21, wherein one arm of the pair of members is of equal length to the other arm of the pair of members.
24. A bone harvesting apparatus according to claim 18, wherein a channel of the set of at least one dilation channels comprises means for docking to the bone.
25. A bone harvesting apparatus according to claim 24, wherein the means for docking comprises an arcuate sharp edge.
26. A bone harvesting apparatus, the apparatus comprising:  
a collection shaft; and  
a stainless steel cutting tip permanently attached to the collection shaft, the cutting tip

comprising openings adapted to allow cut bone chips to move into the collection shaft's interior.

27. An apparatus according to claim 26, wherein the cutting tip is bonded to the collection shaft.
28. An apparatus according to claim 26, wherein the cutting tip is mechanically fastened to the collection shaft.
29. An apparatus according to claim 26, wherein the cutting tip is ultrasonically welded to the collection shaft.
30. An apparatus according to claim 26, wherein the collection shaft comprises a biocompatible polycarbonate material.
31. A bone harvesting apparatus, the apparatus comprising:  
a cutter device comprising, at the proximal end of a collection shaft, a depth gage that indicates a depth to which the cutter device has advanced into a patient's bone.
32. A bone harvesting apparatus according to claim 31, the apparatus further comprising:  
calibration marks at the distal end of the collection shaft that indicate a volume of bone harvested.
33. A bone harvesting apparatus according to claim 31, wherein the depth gage is readable when the cutter device is inserted into a dilation channel.

34. A method of harvesting bone, the method comprising:  
creating a conduit from a patient's skin to a bone harvest site through a small incision in the  
patient's skin;  
expanding the diameter of the conduit by inserting, into the small incision, a dilation  
channel; and  
inserting a cutter device, comprising a hollow collection shaft, into the small incision.
35. A method according to claim 34, wherein the method further comprises:  
expanding the diameter of the conduit by inserting a plurality of dilation channels of  
sequentially increasing size.
36. A method of harvesting bone, the method comprising:  
docking a channel to a bone harvest site; and  
inserting a bone harvesting device into the channel, the bone harvesting device comprising a  
hollow collection shaft.
37. A method of harvesting bone according to claim 36, the method further comprising:  
moving the channel in an arcing motion over the bone harvest site to permit the bone  
harvesting device to harvest bone from more than one position.
38. A method according to claim 36, wherein the channel comprises a pair of members  
protruding from its distal end to position itself against the bone harvest site.

39. A method according to claim 36, wherein the channel comprises means for docking to the bone harvest site.
40. A method according to claim 39, wherein the means for docking comprises an arcuate sharp edge.
41. A method according to claim 36, wherein the channel is inserted through a percutaneous incision.
42. A method of harvesting bone, the method comprising:  
inserting a hollow cylindrical coring device, comprising a permanently attached cutting tip, through a guided delivery system to engage a bone harvest site; and  
rotating the coring device in each of a clockwise and counterclockwise direction, the rotation in each direction harvesting bone through the permanently attached cutting tip.
43. A method according to claim 42, wherein the cutting tip is bonded to the coring device.
44. A method according to claim 42, wherein the cutting tip is mechanically fastened to the coring device.
45. A method according to claim 42, wherein the cutting tip is ultrasonically welded to the coring device.
46. A method according to claim 42, wherein the hollow cylindrical coring device is inserted through a percutaneous incision.





54. A coring device for harvesting bone, the coring device comprising:  
a hollow cylindrical shaft defining a longitudinal axis; and  
a cutting tip permanently attached to the shaft, the cutting tip being configured to  
permit harvested bone to pass into the hollow cylindrical shaft and comprising:  
two protruding blades joined at one end, each protruding blade comprising a  
counterclockwise cutting edge and a clockwise cutting edge; and  
two downward-facing cutting edges, each extending in a circumferential direction with  
respect to a circle in a plane perpendicular to the shaft's longitudinal axis.
55. A coring device according to claim 54, wherein the cutting tip further comprises:  
two support blades, each support blade comprising a counterclockwise cutting edge and a  
clockwise cutting edge and extending between a support section of the cutting tip and one of the  
protruding blades.
56. A coring device according to claim 54, wherein the two protruding blades are at a 45° angle  
to the shaft's longitudinal axis.
57. A coring device according to claim 54, wherein the cutting tip is bonded to the hollow  
cylindrical shaft.
58. A coring device according to claim 54, wherein the cutting tip is mechanically fastened to the  
hollow cylindrical shaft.

59. A coring device according to claim 54, wherein the cutting tip is ultrasonically welded to the hollow cylindrical shaft.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

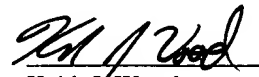
Applicants:	O'Neill	Atty Dkt: 2507/101
Serial No.:	Not yet assigned	Art Unit: Not yet assigned
Date Filed:	Herewith	Examiner: Not yet assigned
Invention:	BONE HARVESTING METHOD AND APPARATUS	Date: August 3, 2001
	Reissue Application for U.S. Patent No. 5,954,671 of O'Neill	



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Commissioner for Patents  
Washington, D.C. 20231

STATEMENT REGARDING SUPPORT IN DISCLOSURE.

FILED WITH REISSUE APPLICATION PURSUANT TO 37 C.F.R. §1.173(c)

Dear Sir:

Pursuant to 37 C.F.R. §1.173(c), Applicant provides herewith a description of the status of all claims, and an explanation of the support in the disclosure of the patent for the added claims.

*Status of Claims*

Claims 1-59 are pending in this reissue application, of which claims 1-15 issued on September 21, 1999, and claims 16-59 are added herewith.

*Explanation of Support in Disclosure*

Support for the added claims is found at the following listed places, amongst others, in the disclosure of the patent. This listing should not be taken as exhaustive, or as necessarily limiting the claims by the examples given.

Claims 16-17: Col. 6, lines 10-42

Claim 18: Col. 4, lines 3-59

Claim 19: Col. 2, lines 3-7

Claim 20: Col. 5, lines 35-40

Claim 21: Col. 4, lines 44-46

Claim 22: Fig. 1

Claim 23: Figs. 7B-7D

Claim 24: Col. 6, lines 35-37

Claim 25: Fig. 2D

Claim 26: Figs. 1, 6A, 6B; Col. 5, lines 45-49

Claims 27-30: Col. 5, lines 45-49

Claim 31: Col. 6, lines 42-44; Col. 5, lines 52-59

Claim 32: Col. 5, lines 52-59

Claim 33: Col. 5, lines 56-59

Claim 34: Col. 6, lines 10-42

Claim 35: Col. 6, lines 23-25

Claim 36: Col. 6, lines 10-39

Claim 37: Col. 6, lines 44-51

Claim 38: Col. 6, lines 35-37

Claim 39: Col. 6, lines 35-37

Claim 40: Fig. 2D

Claim 41: Col. 6, lines 13-25

Claim 42: Col. 5, lines 10-44

Claims 43-45: Col. 5, lines 45-49

Claim 46: Col. 5, lines 17-19

Claims 47-53: Col. 5, lines 10-49 and Fig. 6A

Claims 54-59: Figs. 1, 6A, 6B, and Col. 5, lines 45-49

It is believed the claims are in condition for allowance. Consideration of the claims and issuance of a notice of allowance are respectfully requested.

Respectfully submitted,



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